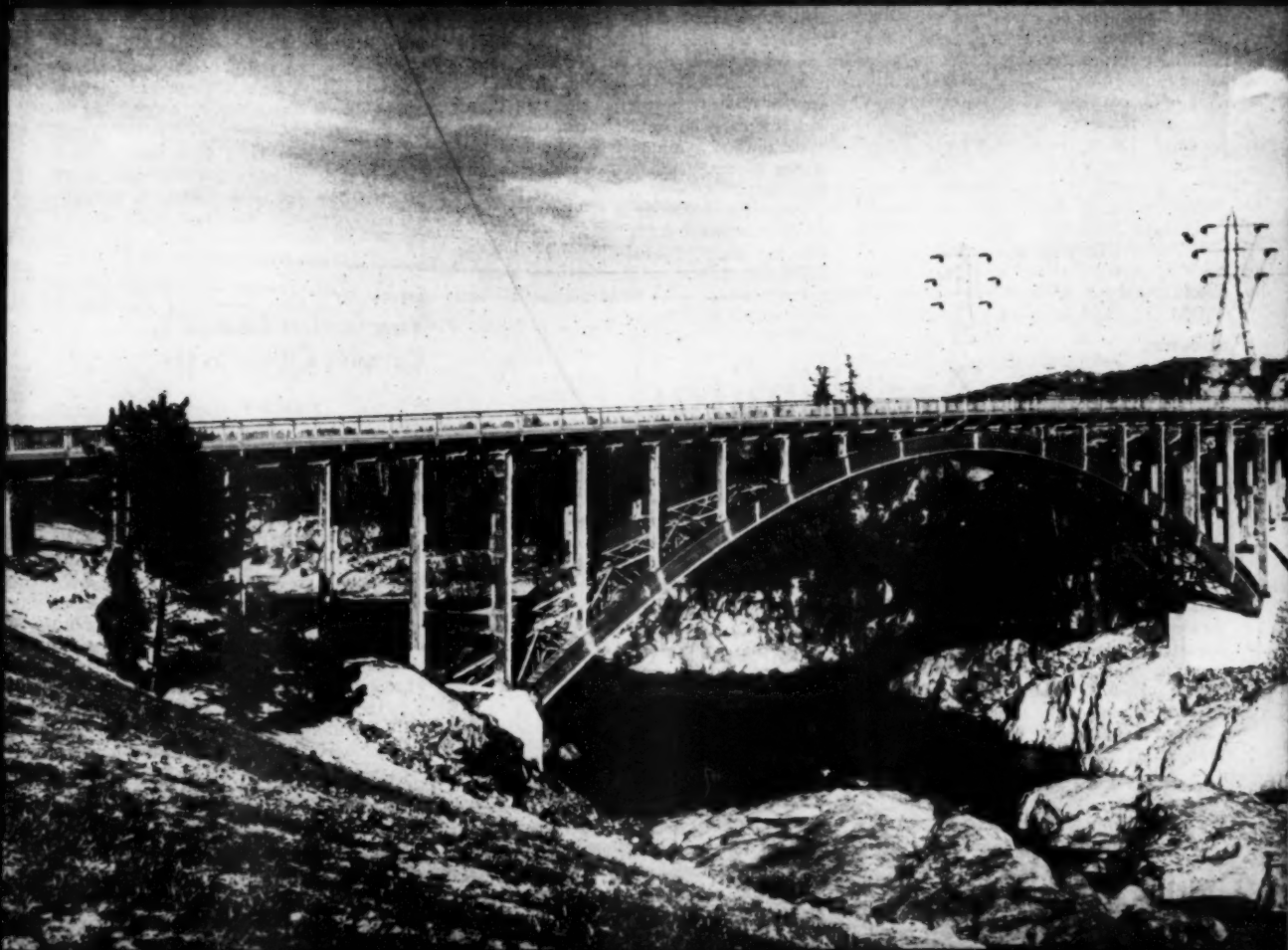


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February 23, 1951

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



No Point

Page 125

A SCIENCE SERVICE PUBLICATION

RESOURCES

Russia Has Minerals

Engineer organization told that Soviet Union is well supplied below ground, but lacks industrial capacity to produce minerals for long war.

► THE SOVIET UNION is generally well supplied with minerals in the ground, the American Institute of Mining and Metallurgical Engineers meeting in St. Louis was told by Paul M. Tyler, mineral technologist of Bethesda, Md.

Russia has made astonishing progress during the past quarter century in expanding mineral production, he said, but it still lacks enough industrial capacity to wage a long drawn-out war on a large scale. Despite impressive gains, the production of minerals in the Soviet Union is less than one-third that of the United States.

Even in agriculture the Soviet Union makes a relatively poor showing in comparison with its population and natural advantages, he stated. Output per worker is far below the American standard in all fields of production and due to the large numbers needed on farms fewer workers

are actually available for industry and mining in Russia than in our own country.

Enough is known of the geology of the area under Soviet control to evaluate claims of new mineral discoveries. Virtually all Russia's mineral supply sources are vulnerable to air attack or sabotage. The already inadequate supplies of oil are largely confined to the shores of the Caspian Sea.

Copper production would be dangerously reduced by damage to the principal refinery near Sverdlovsk or to the Kounrad mines and smelter. The Ridder mine, one of the world's greatest mines, is the predominant source of lead and zinc. Even iron and steel output is more highly localized than is generally supposed. It is almost equally divided between the Donets basin of the Ukraine and the Urals plus the recently developed outpost in the Kuznetz basin.

Science News Letter, February 24, 1951

RESOURCES

Plastics Are Limited

► WIDE-SPREAD hopes that plastic materials will be available to replace strategic metals in civilian products were blasted by C. W. Blount, vice-president of Bakelite Company, a long-time manufacturer of plastics.

"It has come to our attention," he said, "that currently published news reports offer promise of replacing metals with plastic materials. These reports have given the erroneous impression that plastic materials are available in quantity, have no real established uses of their own that are vital, and therefore supplies can be drawn upon immediately."

The two most likely plastics for replacing metal in any type of construction are phenolic laminates and a type of glass laminate employing a plastic resin known as styrene polyester, he stated.

Phenolic laminate materials are limited by the allocation of phenolic resin by suppliers who can not produce enough because of shortage of raw material. The uses of these products are for such essential items as silent timing gears for automobiles, various types of electrical insulators to assure availability of electric power and numerous similar applications.

Projected war demands for the second of these materials, styrene polyester for glass laminates, have been such that current facilities for producing the glass fibers are being

expanded several fold. Requirements of these products for landing craft, radomes, and many classified war items are such that the industry can not under any conditions hope to manufacture sufficient quantities with the raw materials available.

Both of these two plastics involve resins which are made all or in part from benzol. Any expansion of availability would force a decrease in the amount of benzol for the production of synthetic rubber.

Science News Letter, February 24, 1951

OCEANOGRAPHY

Mysterious "Red Tide" Tracked by Postcards

► AID in tracking down the mysterious "red tide" outbreaks that periodically wipe out the fish in the Gulf coast areas is expected from plastic postcards being dropped now in the Gulf of Mexico. The first of these postcards has been returned to Washington, D. C.

Several thousand of these postcards, each sealed in a plastic container, will be dropped by a Navy plane in the Gulf area during the year. It is expected that, after drifting about in the Gulf currents, they will be cast up on beaches. A message, in both English and Spanish, asks the finder to return the card to the Gulf States Fisheries

Commission at New Orleans, La.

From information on the returned card, scientists will figure out the paths which the cards and, therefore, the currents, must have followed. This pattern will show what connection there is between the currents and the production of the red tide organisms.

Red tides are known to be caused by sudden multiplication of red-colored, one-celled organisms called protozoa, which are near the bottom of the evolutionary scale. The postcard survey of currents will help to predict and control such outbreaks in the future.

The cards will also help to trace complex Gulf currents and the distribution and migration of commercial fish stocks, including shrimp. The Interior Department's Fish and Wildlife Service, the Gulf States Marine Fisheries Commission, the State of Texas, Texas A & M College and the Office of Naval Research are cooperating in the project.

Ocean currents have long been studied by following drifting objects, usually sealed bottles containing cards. However, the path followed by drift bottles is often greatly affected by the winds.

Science News Letter, February 24, 1951

ASTRONOMY

Year's First Comet Coming Closer to Us

► FAINT COMET Pajdusakova, the year's first comet discovered Feb. 4, is pulling away from the sun, but getting closer to the earth. On Feb. 27 it will make its nearest approach, being only 92,000,000 miles from our planet and thus about the same distance away as is the sun.

Rapidly speeding away from the sun, the comet is becoming fainter. It will probably have faded from ninth magnitude, its brightness when discovered and too faint to be seen without a telescope, to eleventh magnitude by April, estimates Dr. Allan Maxwell of Howard University, Washington, D. C.

The path of the comet is almost perpendicular to that of the earth, Dr. Maxwell calculates. This partly explains why the comet, itself quite faint, was picked up while still so near the sun's blinding light.

Racing across such constellations as Vulpecula, the little fox; Cygnus, the swan; Cassiopeia; and Perseus, the comet will soon best be seen in the evening just after sunset instead of in the early morning shortly before sunrise. But by the time it reaches the night sky late this spring, it will have faded so much it will be visible with only the best telescopes.

Dr. Maxwell's figures agree closely with orbital data received from Dr. L. E. Cunningham of the Students' Observatory, Berkeley, Calif., as calculated by Joseph Bradley.

Science News Letter, February 24, 1951

ASTRONOMY

New Flashing Star Seen

*** Faint red star, member of double star team, suddenly quadrupled its brightness and then returned to normal within a few minutes. Found on photographic plate.**

► A NEAR-BY red star suddenly quadrupled its brightness, then within a few minutes returned to normal, Dr. Peter van de Kamp and Sarah Lee Lippincott of Sproul Observatory, Swarthmore College, Swarthmore, Pa., have just reported.

This is the sixth star known to have such sudden spurts of energy, the first of these being discovered less than a decade ago. All have been faint red stars, comparatively small and cool.

"The faint red star named Kruger 60 B, during a two-minute exposure, averaged four times its normal brightness," the Swarthmore astronomers state. "An exposure taken 11 minutes earlier, and another taken two minutes later, show the star at normal brightness."

Although this star has been photographed off and on for 20 years, only one such flare-up has been found among over 500 plates. This occurred the summer of 1939.

This new flare star is the faint member of a double star team relatively near us, astronomically speaking. It is about 75 million million miles away. The larger star of the pair is a quarter as massive as our sun, the smaller flaring one only a seventh, the

smallest mass measured for any visible star.

Both stars of the pair are quite faint. Five hundred stars like the larger or 2,000 as bright as the smaller would be needed to give forth as much light as our sun. During the outburst the fainter star equalled its companion in brilliance.

Late last fall our nearest star neighbor, Proxima Centauri, was found to have had some 50 of these flare-ups within the last 25 years. Only one star has been caught in the actual act of flaring and its changes in brilliance studied. Telescopes have been used to discover each flaring star.

No novae or "new star" these, but tired old stars so faint that geysers of blue-hot gas shooting out into space markedly increase their brightness.

These stellar flares are believed similar to those occasionally seen on the sun when an area near a sunspot flares up for several minutes. But these flares on the more distant stars cover a proportionally larger area of the surface and the eruptions represent a much more catastrophic outburst than those seen on our relatively brighter and hotter sun.

Science News Letter, February 24, 1951



LINEAR ACCELERATOR — Electrons shoot into this 21-foot length of pipe where they are pushed along, riding on waves of high-frequency electricity and building up as much as 17 million volts of energy. This new machine, now in use at the Massachusetts Institute of Technology, will add to our knowledge of the nature of matter.

mined per man up to 200%.

In the combustion field, with improved equipment less than one-half as much coal is now required to develop a kilowatt-hour of electrical energy by public utility power plants than some 30 years ago. In home heating, much progress has been made in providing smokeless and convenient automatic heat from solid fuels with stoker-fired, bin-fed, and ash-removal furnaces in the last two decades.

Science News Letter, February 24, 1951

ENGINEERING

Need To Mine Coal Better

Cheaper and more efficient methods are two great needs of industry. Engineers urged to promote technological research to this end.

► CHEAPER methods of mining coal and more efficient methods of using the product are two great needs in the coal industry, it was indicated at the meeting of the American Institute of Mining and Metallurgical Engineers in St. Louis.

There is probably no large industry in the United States that is in greater need of technological research leading to economic improvement than the coal industry, the engineers were told by Dr. Arno C. Fieldner and Dr. Ralph L. Brown of the U. S. Bureau of Mines. The research is necessary if coal is to hold its own in the fuel field in competition with oil and gas, relative to which much research has been conducted during the past two decades.

Before 1930, the coal industry conducted very little research, these government scientists stated. The principal problems of

the industry were mining coal from the beds and handling it at low cost. Research on better utilization was left to coal-burning equipment builders and to the government and educational research agencies.

The situation changed during the 1930s. Today there is a vast amount of research on synthetic liquid fuels, mechanical coal miners, gasification of coal, production of power gas by underground burning of coal beds and better methods of recovering fine coal from washery waste.

Obviously the greatest research development in the coal industry from an economic point of view has been in the mechanism of mining. Loading machines of large capacity are in common use. New continuous coal mining machines, which cut coal from the face without drilling or blasting and also load it, have increased the tonnage

ENGINEERING

Colored Glasses Unsafe For Night Driving

► USE of colored glasses to reduce glare during night driving is dangerous, warns Dr. A. R. Lauer of Iowa State College.

Some colors seem to reduce glare and in fact actually do. But they also reduce what can be seen.

Dr. Lauer tested the effects of 17 different color filters, ranging from violet to deep red. None aided vision in any way when the light level was low, as it is during night driving. Details of the tests were reported to the Highway Research Board in Washington, D. C.

Science News Letter, February 24, 1951

PHYSICS

New Rain Theory

Based on finding that water droplets which later form rain form on relatively large particles of salt. Size of salt particles corresponds with size of raindrops.

► **STUDY** of salt particles found in sea air has produced a new theory of how rain is formed which may well conflict with the theory propounded by the chief rain-maker, Dr. Irving Langmuir.

Alfred H. Woodcock, of the Woods Hole Oceanographic Institution, measured the number and size of salt particles nature uses in making rain to be found in marine air out at sea and as far as 100 miles inland. He found something which he believes has never been discovered before—that nature uses relatively large particles of salt around which to form water droplets which become rain.

Further, the number and size of the salt particles he took out of the air corresponded quite well with the number and size of drops in subsequent rain storms.

Weathermen and cloud physicists before this had believed that rain could only be formed in the presence of small particles—nuclei as they are called. The question then was, how could drops large enough to fall out of a cloud form from these tiny particles fast enough to produce the amount of rain which usually falls.

Dr. Langmuir explained this with his "chain reaction" theory. He said that water particles grew by colliding with other particles until they reached an unstable size. Then, they broke up into several drops, which in turn immediately began growing. Each of these then broke up into several drops and thus the chain reaction started.

Mr. Woodcock's studies led him to believe that, at least in warm air, this process is not necessary. If water droplets form around relatively large particles, he thinks,

they become large enough fast enough to produce rain.

He checked his research on the size and distribution of salt particles with other studies made in Japan, Ottawa and Washington. The Japanese study showed the variation in salt content of the water with the intensity of rainfall. The Canadian and American studies showed the variations in the size of drops with the rain intensity. These studies fit with Mr. Woodcock's, made in Florida. And this fit led him to believe that his theory may have validity for rain made in air that is below freezing as well as the warm air in which he worked.

Dr. Langmuir's rain-making experiments are based on his "chain reaction" theory. He seeds a super-cooled cloud with artificial nuclei—enough, he says, to start a chain reaction.

Mr. Woodcock presented the results of his study in a paper before a national meeting of the American Meteorological Society in New York.

Science News Letter, February 24, 1951

A cord of good quality wood will supply as much *heat* as a ton of coal.

Very many uses have been found for the *silicones* in the five years since these products of research were announced; they are plastics based on organic matter and silica.

Hybrid corn, now generally grown in America's corn belt, is producing a 25% greater yield on less acreage than the types produced a decade or two ago.

Question Box

ASTRONOMY

How many comets are now in the heavens? p. 119.

How rapidly can a star flash up and return to normal? p. 115.

ENGINEERING

What are the greatest needs of the coal industry? p. 113.

What machine may soon be translating Russian? p. 120.

GENERAL SCIENCE

Who has made a study of the confused flour beetle? p. 117.

MEDICINE

How are dyes linked with cancer? p. 124.

Photographs: Cover, Leo Litwin; p. 115, MIT; p. 117, USAF Air Materiel Command; p. 119, GE.

How can you find out how to make a wooden "iron lung"? p. 120.

OCEANOGRAPHY

To what scientific use have plastic postcards been put? p. 114.

PHYSICS

Why were salt particles in the air measured? p. 116.

PHYSIOLOGY

How high must a cliff be to show up 13 miles away? p. 119.

RESOURCES

What limits the use of plastics to replace scarce metals? p. 114.

TECHNOLOGY

Of what is artificial fur made? p. 118.

RADIO

Saturday, March 3, 1951, 3:15-3:30 p.m., EST

"Adventures in Science," with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. Charles E. Odegaard, executive director, American Council of Learned Societies, will discuss "Consequences of Learning," speaking to winners of the Science Talent Search at the Statler Hotel, Washington, D. C.

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GENERAL SCIENCE

STS Winners Study Nature

Physics and chemistry are also represented among the projects of those who will attend the Science Talent Institute as most talented 40 in nation-wide search.

► **HIGH-SCHOOL** scientists who may be leaders in tomorrow's world of science will meet in Washington, D. C., March 1 through 5 for the Tenth Annual Science Talent Institute. They will bring with them the results of their favorite hobbies and pet projects for an evening of getting acquainted with each other's achievements before an audience of several thousand invited guests.

Confused Flour Beetle Studied

► **WHAT** makes a confused flour beetle act like a skunk? Finding the answer to that question has been the scientific project of 16-year-old Rhea Mendoza, who goes to Forest Hills High School, Forest Hills, N. Y., and who is among the top 40 in the Tenth Annual Science Talent Search.

The confused flour beetle is called that not because it is especially confused itself but because man confuses this pest with another flour beetle, the rust-red. It gives off a gaseous compound which it secretes from glands.

Miss Mendoza wanted to find out what stimuli make the beetle let go with its smell, whether it ever got used to the stimuli and what effect this gaseous compound had on the larvae of this beetle.

She found that merely prodding the insect caused it to produce the odoriferous compound. Other stimuli, such as heat or electricity, didn't work. In addition, Miss Mendoza discovered that the confused beetle did not get used to the prodding, but continued to give off its smell when prodding was repeated.

Miss Mendoza had read that if larvae were subjected to the gaseous compound, they would grow up deformed. In the course of her experiments with this idea she discovered what she believes to be a new way of subjecting larvae to the gas. Methods described in science textbooks were too complicated for her.

She merely put larvae and adult insects in a closed container and shook it. When the adults were thrown against the sides they emitted the gas and the larvae were bathed in it. Now she is developing the exposed larvae to see what happens.

Miss Mendoza wants to be a research biologist.

Constructs Cyclotron

► A 17-year-old scientist in Kenmore, N. Y., constructed an atom-smashing cyclotron. The young man, Robert E. Simpson, a senior at Kenmore Senior High School, built this complicated research instrument from engineering details found in scientific

journals and with the personal advice of the cyclotron's inventor, Dr. Ernest O. Lawrence.

Mr. Simpson wrote Dr. Lawrence, at the University of California, after he had all the engineering details except a half dozen items which were not clear from the technical journals he studied. He sent his plans to Dr. Lawrence with his questions.

The famed physicist answered Mr. Simpson's questions and commented: "Looking your plans over, I certainly want to congratulate you as it seems to me that your plans are very good."

The cyclotron has many parts. The magnet alone consists of more than 3,000 pieces, which Mr. Simpson "stacked" himself, a physically hard and dirty job. There are 16,000 feet of wire in the coils, wound by hand.

The cyclotron will be used at Mr. Simpson's school for teaching and demonstration purposes. Also Mr. Simpson plans to expose fruit flies and other laboratory animals to the gamma rays or radioactive isotopes he produces so that he can continue his research.

Mr. Simpson is an Eagle Scout and wants to become a nuclear physicist.

Purer Water for Paper

► **DUPLICATING** the water purification process of a paper mill in Cloquet, Minn., and trying to find ways of doing it better was the project of 16-year-old David C. Larson. The mill uses 6,000,000 gallons of water every day from a river which drains a swamp area, and it has to be made pure and color-free before it can be used in manufacturing paper.

Mr. Larson succeeded in repeating, on a small scale, the complicated chemical process by which the paper manufacturers do this. He then went on with other chemical materials to see if he could do it better.

Mr. Larson considered not only the chemical reactions involved, but also the practical aspects of handling such large amounts of water.

The young senior, who ranks number one in his high school class, hopes to be a research chemist.

Flight of Insects Studied

► **ANOTHER** step toward fulfillment of the dream of man to fly as efficiently as the insects may well have been taken by 17-year-old James J. Cowan III of Maryville, Tenn. Following the example of Leonardo Da Vinci and more modern aeronautical students, he has constructed what he con-

siders to be a new arrangement for observation of the flight of insects.

Mr. Cowan, a senior at Maryville High School, concludes from his study of approximately 50 insects that "if an airplane of reasonable size could be constructed to utilize practically the wing motion of insects, it would be able to hover and fly rapidly, and do both with a low consumption of power—a fact which remains to be accomplished today."

Mr. Cowan, who wants to be an aeronautical engineer, photographed his insects—horse flies, bumble bees and wasps—with a small camera and a triggered strob-flash. The insects were held in position with modeling clay.

With this arrangement, he discovered that the wing paths took the form of a figure eight. In this way, he said, the angle of attack of the wing was in a lifting position at all times.

Kitchen Becomes Laboratory

► **COOKING** for her family from the time she was nine years old led to top honors for Patricia Cummisford. The 16-year-old Arlington Heights Township High School



FUR SUBSTITUTE — This shiny imitation wolf pelt is made from nylon. For parkas it has the advantage that it is moisture resistant; frost crystals from the wearer's breath can be easily brushed off. Inspecting the synthetic wolf are Brig. Gen. Fred R. Dent, Jr., chief of the AMC Engineering Division, and Donald B. Huxley, chief of the Aero Medical Laboratory Clothing Branch. The nylon fur will soon replace wolf fur on USAF Arctic clothing. (See Page 118).

senior of Arlington Heights, Ill., took over the kitchen duties when her mother died seven years ago.

She soon became interested in the changes undergone by various kinds of food in the cooking processes and she began to figure them out chemically.

In one series of experiments, Miss Cummisford studied the actions of various kinds of leavening agents, yeast, baking soda and baking powder. She found that a double action type of baking powder, starch and baking soda with an acid constituent consisting of a combination sulfate-phosphate, was quite satisfactory for cooking because only a portion of the carbon dioxide was liberated at room temperature. Thus, cookies could be stored in the refrigerator before baking.

She is also studying sugar and starch cookery, egg cookery, and colloidal dispersions (foams and emulsions).

Miss Cummisford plans to continue study in the field of science as related to food and perhaps some day, she says, "I will be a scientist working in one of the many laboratories throughout the world—working for the betterment of mankind."

For Better TV Reception

► EXPERIMENTS which point the way to better television reception have been per-

formed by 17-year-old Dana R. Spencer, a potential physicist.

A senior at the Arlington Senior High School, Arlington, Mass., Mr. Spencer thought of applying the theory of diffraction—the bending of light, sound and water waves around obstacles—to the electromagnetic waves used in radio and television.

Television waves travel in a straight line and therefore cannot go through a hill. However, if there is diffraction in television waves, Mr. Spencer figured, like the diffraction in light waves, some advantage might be taken of this fact in improving television reception.

Mr. Spencer first experimented with light waves. He set up a pinpoint light source, focused it on a screen, placed an obstacle in its way and photographed the result. The diffraction could be clearly seen and measured in the photographs.

The young scientist then transferred his experiments to the roof of his house. He used about 20 feet of wire netting as his obstacle and then took a series of readings of the strength of the signal of a local television station.

Mr. Spencer concluded that more experiments with several extraneous factors better controlled needed to be done before his theory about television wave diffraction could be either proved or disproved.

Science News Letter, February 24, 1951

GENERAL SCIENCE

Draft Control Planned

Two organizations being set up to handle deferment of college students and scientists. One is advisory committee for Selective Service, other in manpower office.

► A RACE is on between Selective Service Director Lewis B. Hershey and Mobilization Director Charles E. Wilson's new manpower policy committee for control of draftable college students and scientists.

The manpower committee's new director, President Arthur S. Flemming of Ohio Wesleyan University, is still an innocent bystander, but it will probably be one of the first problems he has to take up.

General Hershey is preparing to set up an advisory committee to Selective Service which would plan now for the selection of the 75,000 students to be deferred to enter college next fall. This committee would also advise General Hershey on deferring young scientists in vital industries.

At the same time, the National Security Resources Board's manpower office is preparing an executive order creating a National Scientific Personnel Board under Dr. Flemming. This board would have the same duties General Hershey wants his committee to perform.

The new draft bill, recently reported out by the Senate Preparedness Subcommittee, calls for a five-man Presidential Commission to select those who would be per-

mitted to go to college on a competitive basis.

The idea of the National Scientific Personnel Board comes from the so-called Thomas report, written by a committee headed by Executive Vice-President Charles Allen Thomas of the Monsanto Chemical Company. It is expected that the Thomas Committee—the Scientific Manpower Advisory Committee—will move from N.S.R.B. to the new Flemming manpower office as soon as it is operating.

All hands are agreed that, if any deferments for college training are to be made under the new draft law, plans for an orderly selection of the students should be made as soon as possible.

The proposed law provides, in addition to a method of selection, that the Presidential Commission shall consist of three men from one political party and two from the other, that the students shall wear distinguishing insignia, and that financial assistance shall be given to those students who could not otherwise afford to go to college.

Science News Letter, February 24, 1951

TECHNOLOGY

Artificial Fur Made For Soldiers' Clothes

► ARTIFICIAL fur, suitable for use in Arctic clothing of men in the armed services, is in experimental use at the Wright-Patterson Air Force Base. Two types are in use. One is to replace wolf fur, the other is a substitute for mouton from sheep. Both are inexpensive.

The principal use of these furs in the Air Force is in trimming and lining parka hoods, flight jackets and caps for Arctic operations. Strips of wolf fur, used because its long, smooth-fibered guard hairs enable frost formed by breathing to be easily knocked off, is a satisfactory material. But wolf fur is no longer available in sufficient quantities.

The new synthetic wolf fur, still in an experimental stage, is made of nylon fiber on a backing of knit cotton coated with rubber. As nylon is a poor conductor of heat, the parka wearer's face stays warm. As it does not absorb moisture readily, frost is easy to brush off.

Since sheep are scarce too, the Air Force is experimenting with synthetic mouton made from a blend of two synthetic textile fibers, Dynel and Vicara. Like artificial wolf fur, this synthetic mouton will prove much cheaper than the real material. It will be used for collar trimming on flight jackets and hoods.

Both products rival their natural counterparts in luster, softness, quality and wearability. They are easy to work with and, unlike natural furs which must be sewed together, can be cut in any desired shape or form. These synthetic furs are made by the George W. Borg Corporation, Delavan, Wis.

Science News Letter, February 24, 1951

INVENTION

Television Viewers May Receive Scents

► TELEVISION viewers will receive "appropriate scents" along with the picture and sound by means of a system which brought Emery I. Stern, Jackson Heights, N. Y., patent 2,540,144.

The device will "automatically release predetermined scents at predetermined phases of the action," he states. The odors will not come through the air from the transmitter station but will be released from containers at the receiver by light signals accompanying the radio waves.

Substances to provide various odors are added to a harmless gas and put in containers at the television receivers. The light signals sent from the broadcast station will be of different frequencies, each frequency attuned to release the gas and odor from a particular container. The pressure of the gas will disperse the scent through the room.

Science News Letter, February 24, 1951

PHYSIOLOGY

Distance Flattens Terrain

At 13 miles, the lowest cliff that can be seen rising from landscape is 100 feet high. Limitations of vision may settle geomorphologists' controversy.

► AT THIRTEEN miles away, the lowest cliff that can be seen rising from the surrounding landscape is 100 feet. Anything lower could not be seen at that distance as an elevation or rise in ground.

These findings, which seem to settle a half-century-old controversy among geomorphologists, are reported by Miss Elizabeth W. Olmsted, geology professor at Smith College, and her physician sister-in-law, Dr. Elizabeth P. Olmsted, of Buffalo, N. Y. (SCIENCE, Feb. 16).

The figures for distances and height are for persons of normal, that is 20-20, eyesight with good conditions for visibility. Reduced illumination, haze and subtlety of contour each may affect the height of the cliff that could be seen at 13 miles.

The structure of the retina of the human eye sets a definite limit to the magnitude of relief, or unevenness in the landscape, that can be perceived. In order to produce a minimal image, an object must subtend a visual angle of one minute with the retina, it has been found. The Snellen test for determining acuteness of vision is based on this.

Following the same principles, the Olmsteds worked out their 100 feet at 13 miles formula. A cliff 100 feet high at a distance

of 13 miles (13.06 miles is the exact figure) will subtend an angle of five minutes. This is the same as the angle subtended by the letter of the Snellen 20-20 line viewed at its standard distance of 20 feet.

The physiographer must use map analysis rather than rely on his eyes alone to check observations of topographic form, the Olmsteds point out, since his eyes will not always be able to perceive small differences in contour.

Back in the 1890's geomorphologists divided into two schools of thought on the appearance and nature of upland regions. One school, relying on eye observation and refusing to admit a factor of "optical deception," considered the successive hilltops of the New England and Appalachian regions "the dissected remnants of a once even and continuous surface, beneath which the valleys of today have been eroded."

Scientists of the other school, in contrast, have been convinced that the identical mountain areas consist of a number of planed surfaces separated by small vertical intervals. The followers of this school have stressed the need of checking field observations with map study by means of "projected" and "zonal" profiles.

Science News Letter, February 24, 1951

ASTRONOMY

Four Comets in Sky

► FOUR recently formed comets are now racing across the sky, reports Dr. Harlow Shapley, director of Harvard College Observatory. Two of these were spotted in one night. All are too faint to be seen without the aid of a telescope.

Of these four comets, one was discovered by a woman astronomer in a mountain observatory in Czechoslovakia, (See p. 114), another was found by two Belgians. (See SNL, Feb. 17). Two are periodic comets, rediscovered the same night by Dr. Leland E. Cunningham of the University of California, America's leading authority on the orbits of comets.

Dr. Cunningham used the 60-inch telescope of the Mount Wilson and Palomar Observatories to photograph the two periodic comets. Comet Pons-Winnecke and Tempel No. 2 are of the 20th magnitude, too faint to be picked up by many observatories and a million times fainter than the faintest star visible to the naked eye.

Both of these periodic comets move in

an elliptical path around the sun and are visible for only a few months each cycle. Comet Pons-Winnecke was observed previously many years ago, but has not been seen again until now. Comet Tempel No. 2, reported once before, has not been observed recently.

Science News Letter, February 24, 1951

ENGINEERING

Speedy X-Ray Inspection Through Use of Crystals

► HIGH-SPEED, automatic X-ray inspection of thousands of industrial products is promised by General Electric X-ray Corporation with the use of laboratory-grown crystals which can amplify the X-ray energy a million times. The crystals are made of cadmium sulfide.

The crystal, a semi-conductor because it passes electricity in one direction only, is tiny in size and can be grown from a frac-

tion of a millimeter to several millimeters in cubic size. When excited with X-radiation, it acts as an amplifier tube, releasing torrents of electrons that can be used to operate various types of mechanisms.

These crystals were developed in the G.E. Coolidge Laboratory by Dr. John E. Jacobs, of the laboratory staff, with Dr. Rudolf Frerichs, of Northwestern University, serving as a consultant. Dr. Frerichs is a German scientist who came to this country in 1947.

On a area-for-area basis, these crystals are over 1,000,000 times more sensitive to X-rays than are ionization chambers which are commonly used to measure X-radiation. They are said to be over 1,000 times more sensitive than photo-electric cells, such as those used in "electric-eye" applications. They will do the work that ordinarily requires a much more complex system of vacuum tubes and amplifiers, while at the same time allowing the use of low-intensity X-rays.

While there are many applications for the X-ray with the crystal amplifier, one is in the inspection of canned food to determine a partly-filled can or foreign matter in contents. In the operation, cans pass between the X-ray machine and the crystal. A simple control box and a relay are used to reject the faulty ones.

Science News Letter, February 24, 1951



"CRYSTAL EYE"—Dr. John E. Jacobs, GE X-Ray Corp. research engineer (left), is holding a partly filled can of baby food which has been spotted by a new testing apparatus. Heart of the apparatus is the little crystal holder facing the cans from the left. Dr. Jacobs and Dr. Rudolf Frerichs, physicist of Northwestern University (right), developed the crystal.

MEDICINE

Wooden Respirators Made for Emergencies

► A WOODEN iron lung, or respirator, can be made in a few hours from materials usually found in any community having a lumber yard, hardware store and garage or small machine shop, Dr. Gerald M. Cline and Dr. Homer O. Dolley and Ralph C. Osborn, mechanical engineer, of Bloomington, Ill., report. (JOURNAL, AMERICAN MEDICAL ASSOCIATION, Feb. 17).

The emergency wooden iron lung can be built by a carpenter or cabinet maker with some help from a sheet metal worker, blacksmith or garage man or a high school manual training class.

Such a respirator was used successfully in St. Joseph's Hospital, Bloomington, during the 1949 polio epidemic as an emergency piece of equipment until an iron lung could be brought from another part of the state some 12 hours later, the doctors report.

A pamphlet telling how to make the wooden iron lung is available from the Council on Physical Medicine and Rehabilitation of the American Medical Association, Chicago.

Science News Letter, February 24, 1951

PUBLIC HEALTH

Health Laboratories 59.5% to 99% Accurate

► LABORATORIES of 42 state health departments were rated 59.5% to 99% accurate in certain diagnostic tests in a survey by the Communicable Disease Center of the U. S. Public Health Service.

Thirty of the laboratories rated 90% or better, Dr. R. A. Vonderlehr, medical director in charge of CDC, reported in announcing the results.

The ratings were made on accuracy in tests for certain intestinal parasites such as the amebas that cause amebic dysentery, or amebiasis. From 5% to 10% of the population in the United States is estimated to be infected with this parasite but the disease is hard to diagnose without competent laboratory assistance.

In making the diagnosis, a stool specimen must be taken to the laboratory, where skill and training are required of the technicians if they are to find the parasite when it is present.

Over the past year 98 specimens were mailed from the Communicable Disease Center laboratories in Atlanta, Ga., to the participating state laboratories. At the same time specimens of the same material were mailed to three referees.

The referees determined that 18 of the specimens contained the parasite, while 80 did not. Four of the participating laboratories correctly found all of the 18 specimens which were positive.

On the basis of the results, as well as

other studies, two factors are believed to contribute to the proficiency of a laboratory. One is intensive training of the technician under the direct supervision of a competent parasitologist, together with ample experience in the examination of stool specimens. The other is wise selection of laboratory techniques.

Science News Letter, February 24, 1951

VETERINARY MEDICINE

Cortisone Gets Trial For Sheep Diseases

► CORTISONE, used in the treatment of humans with rheumatoid arthritis and severe burns, is being given trials on sheep at the University of California School of Veterinary Medicine.

"It is possible that certain diseases of cows and sheep can be helped by cortisone," said Dr. L. W. Holm, under whose direction the new research is being done. "Two of such diseases are bovine acetoneemia and 'pregnancy disease' in sheep."

Cortisone and other hormones from the adrenal cortex affect a great number of metabolic processes of the body, he explained. These include the levels in the blood of such substances as sodium, potassium, chloride, and sugar and sometimes the hemoglobin content as well. In addition, the numbers of white blood cells and the percentage of each kind are modified.

"Our present studies are being done with normal, healthy sheep to determine whether moderate to moderately high doses of cortisone cause any dangerous side effects," Dr. Holm stated.

"In our short studies, under the dosages we used, no dangerous metabolic effects have resulted. We do not yet know, however, what effects they would have if administered over a period of four to five weeks, as is the practice with human patients."

Science News Letter, February 24, 1951

AERONAUTICS

Cigarette Balances With Auto Pilot

► A CIGARETTE, balanced on end in a Navy plane, remained upright while an automatic pilot put the plane through a series of turns and maneuvers.

This exacting test of sensitivity was part of an extra-curricular test of a new automatic pilot developed by engineers of the Minneapolis-Honeywell Regulator Company, working in cooperation with the Navy.

Maneuvers included level flight, turns and a runway approach on an instrument landing system.

"A cigarette standing on end furnishes a fairly sensitive accelerometer," explained Hugo Schuck, chief of Honeywell's aeronautical research. "If it doesn't fall over during maneuvers, it indicates that the accelerations are being kept very low."

Science News Letter, February 24, 1951

IN SCIENCE

VETERINARY MEDICINE

Time to Give Bossie Her Spring Calcium

► FARMERS should watch the mineral intake, especially calcium and phosphorus, of their livestock as they come into the new spring production season, the American Veterinary Medical Association warned.

Minerals are so important in the diet of animals that livestock will live longer without any feed than they will on feed that contains no minerals.

"Although animals require more than a dozen different minerals, two of them, calcium and phosphorus, make up 70% of the mineral matter in the body," the veterinary medical association said. "Dairy cows and laying hens especially require them. Half the minerals in milk are calcium and phosphorus."

The AVMA cited the delicate relationship between calcium and phosphorus in the body as an instance of the need for a careful check on farm animals' requirements. Too much of one without the other can lead to a deficiency disease, the association said.

Science News Letter, February 24, 1951

ENGINEERING

Electronic Brain May Translate Russian

► HIGH-SPEED electronic "brains" may soon be translating Russian technical information into English.

The possibility that SWAC, the National Bureau of Standards automatic computer located at the University of California at Los Angeles, could be used for translating has been explored during the last six months by Dr. Harry D. Huskey, Dr. Victor A. Oswald, Jr., and Stuart L. Fletcher.

They used German for their experiments to see if translation techniques could be developed. Russian or a number of other languages could be broken down in the same way, however.

SWAC — which stands for Standards' Western Automatic Computer—can add 10-digit numbers at the rate of more than 15,000 additions per second. Memory drums capable of storing 8,000 words are planned for the near future.

If a suitable translation would be made merely by substitution of the English equivalent of each foreign word, the problem would be simple. Unfortunately, translation involves more than a mere substitution of the words of one language for those of another.

Science News Letter, February 24, 1951

SCIENCE FIELDS

SEISMOLOGY

Five Quakes Occurred In Little Over Day

► FIVE earthquakes in just a little over a day have rocked the earth's crust, the first flare-up of such magnitude and intensity since before last Christmas.

A strong tremor was centered off the southern coast of the Alaskan peninsula, near Kodiak Island (55 N, 156 W) on Feb. 13 at 5:13 p.m. Its magnitude was reported as 6.5, severe enough to have caused extreme damage if it had occurred in a settled region.

Eastern Siberia (66 N, 135 W) has been spotted as the center of the first of the quakes, occurring at 12:22 p.m. EST on Feb. 12. A strong quake, it was picked up by more than 20 stations throughout the world. Seismologists at the Coast and Geodetic Survey, who pinpointed the quake with the aid of information gathered by Science Service, state that the earth tremor could not have been caused by an atomic explosion.

The region of Samoa (16 S, 176 W) shook with a magnitude 7 quake at 6:55 a.m. EST, Feb. 13. Areas off the tip of southern California and off the coast of Guatemala were spotted as the origins of the two other earthquakes on Feb. 13.

Science News Letter, February 24, 1951

PUBLIC HEALTH

Two Methods Make Raw Milk Safe

► IN CASE of fire, flood or bombing attacks, community milk-processing plants may be put out of commission. Residents then may only be able to get raw milk, with its danger of carrying dangerous disease germs. Raw milk can, however, be made safe for drinking by several simple methods. For emergency use, the U. S. Public Health Service recommends either of the two following:

Method 1. Pour water into the outer unit of a double boiler and bring to a vigorous boil. Pour milk into the inner unit and place within the outer unit. Cover and maintain same heat for ten minutes.

Method 2. Bring milk quickly to a boil in an open saucepan while stirring constantly. Immediately place saucepan in cold water and continue stirring contents until cool. Change cooling water whenever it becomes warm.

Milk treated by either of these methods may sometimes have a cooked flavor, but at least it will not contain harmful germs.

Two other methods which do not affect

the flavor of the milk but take a little longer or require special equipment, are suggested for normal home use where pasteurized milk is not available.

These two are: Method 1. Heat the milk quickly in an open saucepan, stirring constantly, until the contents reach a temperature of 165 degrees Fahrenheit. A dependable cooking thermometer should be used. Then immediately place the saucepan in cold water and continue stirring the contents until they are cool. Change the cooling water when it becomes warm.

Method 2. Use one of the approved home pasteurizers now on the market.

Although pasteurization destroys harmful bacteria, it is not effective against radioactive contamination.

Science News Letter, February 24, 1951

BACTERIOLOGY

"Germs" Helpful in Producing More Food

► BACTERIA, usually thought of as causing ill-health and destruction, can be used by the farmer to increase production from his farm and to get more protein to his animals.

By mixing the proper bacteria with his legume seed, the farmer starts a "chain reaction" that gets better grazing and better hay. Legumes are plants, such as the pea, alfalfa and clover, that change the nitrogen of the atmosphere into a form usable by other plants.

The bacteria produce little lumps on the roots of the legumes, living off the plant. However, they pay "rent" by furnishing the plant with nitrogen taken from the air. This means more nitrogen for the grass plants growing with the legumes, more protein yield per acre.

A properly bacteria-inoculated clover crop may add as much as 240 pounds of nitrogen to the acre, Dr. E. A. Hollwell of the U. S. Department of Agriculture states.

Science News Letter, February 24, 1951

INVENTION

Garment for Workers Supplies Cool Air to Body

► FOUNDRY WORKERS, pilots in speedy planes and others who may work in heat higher than the human body can easily withstand are promised relief with an air-conditioned garment which supplies cool air to the body. The same garment can be used to deliver warm air to the body for workers in extreme cold.

Inventor is Lewis A. Rodert, Cleveland, Ohio. His rights in patent 2,540,547, received for the invention, are assigned to Stewart-Warner Corporation, Chicago. With it must be used an air-conditioning unit, but a relatively small inexpensive one is satisfactory. A head-enclosing helmet is part of the garment.

Science News Letter, February 24, 1951

AERONAUTICS

Interceptor Jet Plane Resembles Delta-Wing

► THE radical-appearing new jet interceptor Douglas XF4D airplane, which has already passed its maiden flight test, resembles somewhat the so-called Delta-wing plane revealed nearly two years ago in this country, with an English version appearing later.

The Delta-wing plane might be said to resemble a giant bomb lying centered on and projecting forward from a large equilateral triangular flat wing surface. Projecting upward from the rear of the fuselage is a triangular surface to give stability in flight. The new plane is described as a triangular shaped platform wing with a slim nose projecting forward to provide a cockpit for the pilot. Like the Delta-wing plane, it has deeply swept-back forward edges of the wing which promote high speed.

The XF4D was designed and built by the Douglas Aircraft Company for the U. S. Navy. It is a carrier-based jet fighter designed specifically for high altitude interception of enemy planes. Its take-off from a carrier deck will be assisted by a catapult, which might be described as a giant slingshot. A particular feature of this plane is its ability to climb rapidly to the upper atmosphere. This ability enables it to intercept an enemy on short notice. Details of the new plane are not released.

Science News Letter, February 24, 1951

CHEMISTRY

Industrial Alcohol Made Cheaply from Grain

► INDUSTRIAL alcohol can be made from grain at a cost less than the conventional malt process, the Department of Agriculture announced in an annual report.

Production of the alcohol, needed for defense, has proved commercially successful. A fungal amylase mold converts sound corn, damaged corn, wheat and grain sorghums into alcohol, Bureau of Agriculture and Industrial Chemistry scientists report.

Science News Letter, February 24, 1951

DEFENSE

New Home for CDA Has No A-bomb Shelter

► THE FEDERAL Civil Defense Agency has just moved into Washington's most modern office building—the Cafritz building. It has everything—air conditioning, modern lighting, speedy elevators—everything, that is except an A-bomb shelter.

Science News Letter, February 24, 1951

ASTRONOMY

Spring Stars Appear

On March evenings, Virgo and Leo with the Sickle, come into view. The planets, Venus and Saturn, add beauty to the early evening skies.

By JAMES STOKLEY

► THE PLANET VENUS, of which we got a glimpse low in the west at sunset during January and which during February shifted into a better position, has now moved well away from the sun. At the beginning of March it sets about two hours after sunset. It descends behind the western horizon about two and a half hours after the sun at the end of the month. As it is the brightest star or planet in the evening sky, there is little difficulty in finding it.

Another planet has come into visibility during March evenings from the other end. This is Saturn which, during early February, rose late in the evening. By March 1, however, it appears around 7:30, and on the 20th, being directly opposite the sun, comes up in the east just as the sun sets in the west. Then Saturn will be visible all through the night.

As shown on the accompanying maps, Saturn is in the constellation of Virgo, the virgin. These maps depict the sky as it appears around 10:00 p. m., your own kind of standard time, on March 1, an hour earlier at the middle of the month and two hours earlier at the end.

Among the star groups of March evenings, the most conspicuous are still those of Orion, the warrior, and his neighbors, but instead of shining high in the south, as they did during the middle of the winter, they are now descending into the southwest. Orion is easily recognizable by the three stars in a row that form the warrior's belt. A little higher and directly west is Taurus, the bull, with brilliant Aldebaran. Still higher we find Gemini, the twins, with Castor and Pollux, the latter of the first magnitude. High in the northwest is Capella, in Auriga, the charioteer.

Sirius Brightest Star

Low in the southwest, to the left of the lower stars in Orion, is Canis Major, the great dog, in which shines Sirius, the dog-star, brightest star that we can see at night. Higher in the sky we come to the lesser dog, Canis Minor, with Procyon. Next to Canis Major, to the left, is the constellation of Puppis, the poop, or stern, of the ship, Argo Navis. This is a large southern constellation, of which the brightest stars do not rise above the horizon for most of the United States or for Canada. Pyxis, the compass, and Vela, the sails, also part of Argo, are indicated, each by a single star.

Over to the east appears Virgo, one of the spring evening constellations now coming into view. In Virgo shines not only Saturn but the bright star Spica, shown near the horizon where it is somewhat dimmed by its low altitude. Above Virgo is Leo, the lion, in which appears the smaller group known as the Sickle. The star Regulus is at the end of the handle of this implement.

Toward the north, the great dipper, part of Ursa Major, the great bear, is climbing high into the sky. In the bowl of the dipper are the familiar "pointers," whose direction leads us to Polaris, the pole star, in Ursa Minor, the lesser bear. The continuation of the curve of the dipper's handle takes us to the constellation of Bootes, the bear-driver, where we can find brilliant Arcturus.

Mercury at Its Best

The planet Mercury will be at its best position of the year, when it can be seen low in the western sky just after sunset, in early April. By the last few days of March it may be possible to pick it up, near the horizon at dusk. Mars is nearby, but much fainter and hard to find. Jupiter, which is in line with the sun on March 11, will not be visible at all in March.

An event that all will welcome is scheduled for 5:26 a. m. EST, on Wednesday, March 21, when the sun, moving northwards through the sky, stands directly over the earth's equator. This is the vernal equinox for us, as it marks the beginning of spring. In southern countries, like Australia, South Africa and Brazil, it is the first day of autumn.

On March 7, in the afternoon, the sun

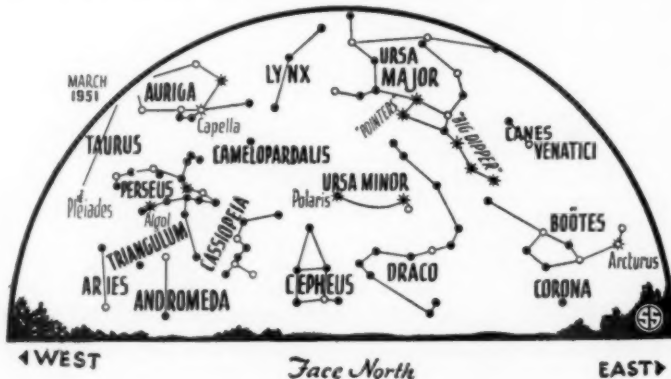
will be eclipsed by the moon. This will be visible as a partial eclipse over southern Ontario and the eastern central and southwestern United States, south of a line running from the vicinity of Milwaukee, Wisc., southwesterly to southern California, near San Diego.

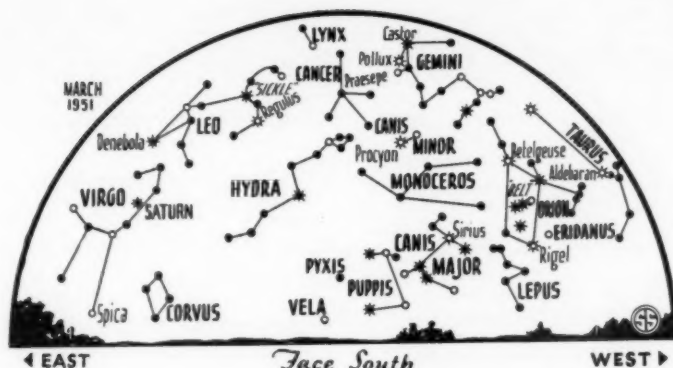
Eclipse Not Total

This eclipse is not total at any point on the earth but is annular. That is, even at its best the sun will not be completely hidden. The eclipse occurs when the moon is relatively far, and so appears a little smaller in the sky than the sun does. Thus, along a path starting near New Zealand, crossing that country, the Pacific Ocean, including Pitcairn Island; then Nicaragua, Costa Rica and the Caribbean Sea, there will be a central eclipse, with the moon coming directly in front of the sun. Even here, however, there will remain visible around the dark lunar disk a ring, or "annulus," of the solar disk, from which comes the name of "annular" eclipse.

Over a much larger area than this path there will be a partial eclipse, with the moon partly covering up the sun. The nearer one is to the path mentioned, the more of the sun will be covered. The following table gives the time of the beginning and end of the partial phases for some of the principal cities where it will be seen, as well as the percentage of the sun's diameter that will be covered:

City	%	Begins P.M.	Ends P.M.
Albany, N. Y.	11	5:14	set
Atlanta, Ga.	34	4:54	6:32
Austin, Texas	34	3:45	5:31
Boston, Mass.	13	5:12	set
Buffalo, N. Y.	9	5:16	set
Chicago, Ill.	7	4:18	5:06
Cincinnati, Ohio	17	5:06	6:20
Cleveland, Ohio	12	5:13	6:13
Des Moines, Iowa	4	4:22	5:01
Flagstaff, Ariz.	3	3:11	3:53
Kansas City, Mo.	10	4:10	5:12





4 EAST Face South WEST
 * * * SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

Little Rock, Ark.	26	3:56	5:27
Louisville, Ky.	20	4:04	5:22
Nashville, Tenn.	25	3:59	5:26
New Haven, Conn.	16	5:09	set
New Orleans, La.	41	3:46	5:36
New York, N. Y.	17	5:08	set
Omaha, Nebr.	3	4:23	4:59
Philadelphia, Pa.	19	5:06	set
Pittsburgh, Pa.	17	5:09	set
Raleigh, N. C.	31	4:58	set
Richmond, Va.	26	5:01	set
Santa Fe, N. Mex.	10	3:05	4:07
Tallahassee, Fla.	44	4:48	set
Washington, D. C.	22	5:04	set

"Set" indicates sun sets eclipsed. Times are local standard times.

The data in this table are taken from a more complete listing in the "American Ephemeris and Nautical Almanac" for 1951, a volume which is prepared annually at the U. S. Naval Observatory in Washington, and is published by the Government Printing Office. For the cities in the northeast where no time of ending is given, the sun sets before the partial eclipse is completed. For all these points, the moon's disk will cut across the southern edge of the sun, moving from west to east.

Protect Your Eyes

Since one should not, ordinarily, look directly at the sun, those in the places where the eclipse may be seen should use some protection for the eyes to see the partial eclipse. This may be the traditional smoked glass, a dense photographic film negative, or a pinhole in a card. However, along the Atlantic seaboard the eclipse occurs near sunset, and dust and haze in the atmosphere might dim the sun's light enough that it may be seen without any protection.

In case completely cloudy weather prevents any view of this eclipse, those who live in the eastern part of the country will have another chance on Sept. 1. Instead of occurring late in the afternoon, that will occur in the early morning, with the sun rising partly eclipsed.

Celestial Time Table for March

March EST		
1	11:48 p. m.	Minimum of Algol (variable star in Perseus)
2	2:00 a. m.	Moon nearest, distance 229,800 miles
4	8:38 p. m.	Algol at minimum
7	3:50 p. m.	New moon; eclipse of sun visible over large area
	5:27 p. m.	Algol at minimum
9	4:36 a. m.	Moon passes Mars
10	1:01 a. m.	Moon passes Venus
15	1:00 a. m.	Moon farthest, distance 251,200 miles
	12:40 p. m.	Moon in first quarter
20	5:00 a. m.	Saturn opposite sun and nearest, distance 788,600,000 miles
21	5:26 a. m.	Sun crosses equator, beginning of spring in northern hemisphere
22	1:33 a. m.	Minimum of Algol
23	2:54 a. m.	Moon passes Saturn
	5:50 a. m.	Full moon
24	10:22 p. m.	Algol at minimum
27	4:00 a. m.	Moon nearest, distance 228,600 miles
	7:12 p. m.	Algol at minimum
30	12:35 a. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, February 24, 1951

GENERAL SCIENCE

Security Clearances Slow Defense Program

► THE TIME that it takes to get security clearances for everyone handling classified material in the accelerating defense program is slowing down progress in many cases.

Before the Korean war an FBI investigation could be completed in a couple of months. But now the number of additional employees has piled the load on the investigators until it takes up to six months.

There are several kinds of investigations and clearances, simplest of which are loyalty checks such as anyone in the government, even those not working on con-

fidential or secret projects, must have.

As the secret nature of the project becomes greater, the necessary procedures become correspondingly more rigorous and timetaking.

Even when the help of some expert is needed urgently, it is very difficult to give him an emergency security clearance on the say-so of some official, no matter how high.

Because the Department of Defense and the Atomic Energy Commission each have to have their own clearances, there may be delay before, for example, an army officer or scientist would be allowed to work with a contractor on a top secret joint Defense-AEC project. The Army representative already fully cleared in his own organization would have to get one of the famous Q clearances of the AEC done by the FBI and he can not get in the line-up until he does.

This is required by the atomic energy act passed by Congress and the dual clearances seem to make no one, particularly the military, very happy.

Science News Letter, February 24, 1951

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New Vitamin Hinted

► **HINT** of a new vitamin or food element essential for rats at least and maybe for animals including man appears in a report from three Italian scientists to *SCIENCE*, (Feb. 16).

The substance is found in crude casein, which is a protein from milk. It is an animal protein factor but is not the same as vitamin B₁₂, state its discoverers, M. Piccioni, A. Rabbi and G. Moruzzi of the University of Bologna Institute of Biochemistry.

The factor is "indispensable for normal

growth and reproduction of rats," they report. It is stored in the animal's body but can be exhausted in two generations. A deficiency of it causes a high mortality, 70% in the first generation and 100% in the second generation. The whole litter always dies and in a very short time.

Newborn rats of the second generation deprived of this factor were saved by small quantities of whole cow's milk, but vitamin B₁₂, one of the animal protein factors, completely failed to save the animals.

Science News Letter, February 24, 1951

MEDICINE

Dyes Cause Cancer

► **LIVER CELLS** turn cancerous when some of their protein content is "deleted" by an azo dye, according to a deletion theory of cancer formation reported by Dr. Harold P. Rusch at an American Chemical Society sectional meeting in Binghamton, N. Y.

Dr. Rusch is director of the McArdle Memorial Laboratory for Cancer Research in the University of Wisconsin Medical School.

Azo dyes are among the 400 chemicals which will cause cancer in laboratory animals. They induce cancer of the liver. Because of their intense color in acid, they are easily traced through the animal's body.

The azo dye forms a complex or chemical union with the protein of the experimental animal's liver cell, Dr. Rusch reported. The amount of this dye-protein chemical complex formed is directly related to the cancer-causing power of the dye.

When the protein is taken out of the cell by the dye, the cell loses some of its specialized features. But it keeps its ability to multiply into more new cells.

From studies such as this, Dr. Rusch said, it should be possible to establish the causative links between application of a cancer-causing chemical, its handling by the body,

the immediate and progressive changes in cell structure and chemistry and the appearance of a cancer.

"Only when these salient features of the carcinogenic (cancer-causing) process are known in some detail," Dr. Rusch said, "can one hope to prevent it, to interrupt it or to eradicate its product, the tumor, by rational means."

Science News Letter, February 24, 1951

ENTOMOLOGY

Powerful Wasp Venom For New Insecticides

► **FROM** the powerful venom of a tiny parasitic wasp, scientists of the Connecticut Agricultural Experiment Station hope to be able to produce new poisons to fight insects.

The wasp venom produces a paralysis that affects the nerves and acts fatally in a different way from DDT, parathion (a nerve gas insecticide) and any other commonly used insecticides.

Caterpillars of the wax moth attacked by the wasp experience a sort of living death, with digestion unharmed, heart beating, and even muscles remaining in good working order even though completely paralyzed and dying after a few days.

Dr. R. L. Beard, entomologist, who made the studies, hopes that by determining the mode of action of the powerful venom, similar synthetic materials may be produced in the laboratory that would have the same deadly effect on insects.

One drop of wasp venom barely seen through a microscope can kill more than 1,600 caterpillars, each many times the wasp's size. This was proved by injecting successively caterpillar blood into other caterpillars. The wax moth upon which these tests were made is notorious for its ability to resist insecticides.

To human beings who suffer from wasp

stings, there may come some help from understanding just how the venom does its damage. Scientists recognize that different people react differently to stings.

Some wasps paralyze the larvae of other insects in order to provide a fresh supply of food for their young when they hatch out and start to grow.

Science News Letter, February 24, 1951

MEDICINE

Dye in Veins Measures Flow of Blood

► **A NEW** medical technique, developed from an old-fashioned engineering process, may become a tool for studying congenital heart defects.

Dr. A. E. Lewis, Dr. Raymond D. Goodman and Dr. M. L. Pearce of the University of California's Atomic Energy Project have adapted the engineering process to research which measures the amount of blood flowing away from the hearts of rabbits.

"Actually, the method is not new," said Dr. Lewis, "but modern electronic equipment made it possible to 'rediscover' this technique of blood flow measurement."

Here is how it works:

Engineers have long known how to measure the rate of water flow through pipe lines by adding a dye to the water and then measuring the concentration of the dye at the point of outlet. The faster the flow, the more diluted the dye.

The U.C.L.A. scientists injected a blue dye into the veins of rabbits, and, with the aid of a new type of photoelectric cell, known as a "photomultiplier," were able to measure the amount of dye in the arteries of the rabbits' ears.

Although the experiments were conducted on rabbits, it may be possible some day to adapt such research to studies of congenital heart defects in human beings, Dr. Lewis said.

Science News Letter, February 24, 1951

INVENTION

Abaca Fiber Used in Artificial Leather

► **IMPROVED** artificial leather bases and shoe stays are promised with rubberized abaca (Manila hemp) fiber paper in patent 2,541,763 issued to William A. Hermanson, Brookline, Mass. It is claimed to be a product far stronger than similar materials used, and more resistant to moisture and wear. It is also flexible and substantially non-stretchable.

This material is made of a pre-formed paper web of new abaca fibers which has been impregnated with rubber latex. Also glycerine and a blue fluorescent dye are incorporated, the dye being a stilbene derivative. The fluorescent dye absorbs ultraviolet light and protects the material from deterioration due to sunlight.

Science News Letter, February 24, 1951

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Spring Flowers Now

► THIS is the time of year when one is apt to take a pessimistic view of the poet's rhetorical query, "If winter comes, can spring be far behind?" It seems, indeed, very far behind as we approach the middle of winter's last half.

Yet you can have spring flowers now. They will brighten up your home, conjure you out of your late-February blues and convince you that perhaps the poet was right after all.

All you have to do is to go out and cut a few sprigs from one of the spring-flowering trees or shrubs. Lilac, cherry, apple, or perhaps, best of all, forsythia or golden bells will usually give good results. Select a branch that has rather large buds, for these are most likely to conceal the coming flowers.

Put your sprigs in a vessel of water in a warm place and be sure to see that the water does not dry out or become foul or sour. In not too long a time, about a week or two, you should see the twigs respond to the artificial spring temperature you have created with an offering of foliage and bloom.

Actually, this is what the florists have done in essence when they force the woody branches now offered in the early spring market. There are other tricks, too, that the ambitious layman can do if he wishes to get his spring flowers ahead of time. The

simplest is merely to pre-immers the twigs in a pan of rather warm water for a few minutes. For best results, the temperature should be just above that which is comfortable to your hand. This extra stimulus will speed up blossoming by several days.

Some florists get good results from hardy, woody branches by pounding the bottom of the stem to a pulp. This maceration opens up the vessels carrying water to the buds, speeding up the blossoming process. It will not work with soft, pulpy sprigs.

Another of the tricks involves a little more in the way of materials and labor. This is to expose the sprigs in a closely covered vessel to the fumes of ammonia, chloroform or several other chemicals. If this is tried, the twigs should be left in the fumes for at least half an hour.

These treatments will work with almost any free-flowering, woody plant that blossoms in the spring. Earlier in the winter they would not have worked because many buds have to go through a somewhat obscure physiological process to which we have given the convenient but not wholly clarifying name of "ripening."

This process goes on slowly during the winter and by the time the corner of the season is turned and spring, though still distant is approaching, the buds are ready to respond to the proper stimuli of water and warmth, even if they are applied a little prematurely.

Science News Letter, February 24, 1951

METEOROLOGY

Better Weather Ahead Is Long-Range Forecast

► A DEFINITE break in the weather pattern over the nation will occur between mid-February and mid-March. Most of the country east of the Rockies can expect temperatures to shift from the colder than normal which people have been experiencing to warmer than normal.

The greatest and "perhaps most welcome moderation" from the 30 days ending in mid-January, says the Extended Forecast Section of the Weather Bureau, will take place in the Midwest, where it has been persistently cold. There, temperatures will average 10 to 15 degrees above the mid-January, mid-February period—a shift larger than can usually be expected at this time of year.

Only Texas, east of the Rockies, will not participate in the good fortune. It will be slightly colder than normal up to mid-March, according to the forecasters. The same condition will exist west of the continental divide.

On Feb. 2, the Extended Forecast Section predicted that the whole of February would be colder than normal for most of the country. This mid-February prediction is not in contradiction to the earlier forecast, according to Jerome Namias, chief of the long range forecasters. Temperatures during the first two weeks were cold enough

On This Week's Cover

► WHAT is believed to be the first all aluminum highway bridge in the world was recently completed at the aluminum city of Arvida, Quebec. The bridge spans the Saguenay River at tidewater and saves a five-mile trip from Arvida to the huge power plant at Shipshaw. The river at this point is 300 feet wide.

The scenic view on the cover of this week's SCIENCE NEWS LETTER shows the 504-foot-long bridge, which never needs to be painted.

Science News Letter, February 24, 1951

to drag all of February below normal, he said.

Most of the nation will have more rain or snow than normal through to the middle of March, according to the prediction. However, New England and the Southeast will have less than the usual amounts, while the Rocky Mountain and Middle Atlantic states will stick pretty close to normal.

Science News Letter, February 24, 1951

Frozen concentrated milk can now be produced that will remain acceptable as a source of beverage milk for several months after it goes into frozen storage.

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MEDICINE

Cortisone Aids Sarcoidosis

► CORTISONE, adrenal gland hormone famous for the relief it brings in crippling, painful arthritis, brought "prompt and marked improvement" to two patients suffering from another disease, sarcoidosis.

The disease is a chronic ailment affecting lymph glands, lungs, bones, intestines, spleen, liver and skin separately or in various combinations. It occasionally is a serious illness resulting in blindness, respiratory insufficiency or death. No cause for the disease is known and so far no effective treatment has been discovered.

The improvement in the patients under cortisone treatment came in lung, skin, tear gland, parotid gland and lymph node involvement. One patient showed improvement in the eye inflammation within 48

hours and at the end of a week was "elated over the change in her appearance" caused by the flattening of the lumps on her skin that came from the disease.

These two patients had severe and widespread sarcoidosis, Drs. Maurice Sones, Harold L. Israel, Mary B. Dratman and Jesse H. Frank, of the Woman's Medical College of Pennsylvania, state in their report (NEW ENGLAND JOURNAL OF MEDICINE, Feb. 8).

Besides the improvement in their two patients, these doctors report finding some evidence that sarcoidosis may be due to or accompanied by impaired functioning of the adrenal glands.

Science News Letter, February 24, 1951

WILDLIFE

Fleas Keep Streams Clean

► THE fresh water flea and a host of its neighbors are serving as "guinea pigs" to help keep our rivers and streams clean.

Dr. Charles E. Renn, of Johns Hopkins University, is using the minute animals to tell just how much waste material can safely be dumped into rivers or streams. If the fleas, nymphs and larvae he uses for his test can take it, chances are that the stream and its fish can too.

Aim of the studies is two-fold; to find how much pollution the tiny animals take before dying and to find out how the pollution affects their survival over a long period of time.

Some industrial wastes contain poisons which may break down and gradually become harmless as they are carried along

in the stream. These do little damage, except in the immediate neighborhood of the plant. Some waste material, however, may be directly and violently toxic to both fish and fish food.

The tiny animals that Dr. Renn uses in his studies are the food which game fish need for survival. Without this food, the fish die out and cannot be replaced. Dr. Renn heads a group investigating industrial waste disposal for the National Research Council.

Science News Letter, February 24, 1951

PUBLIC HEALTH

African Children Have Cirrhosis of the Liver

► UNCOUNTED THOUSANDS of African children from one to six years old suffer from cirrhosis of the liver, a disease usually connected with alcohol.

However, it occurs in these children when they are weaned from their mothers and immediately put upon the usual starchy diet their elders eat. The condition is accompanied by some loss of pigmentation and, sometimes a straightening of kinky hair. It can be cured or prevented by feeding the children skim milk.

The disease is known all over Africa—in fact, it is estimated that more or less all children in Africa suffer from it at some time. It is called Kwashiorkor, an Ashanti word meaning "golden boy" or "red boy" and takes its meaning from the loss of pigmentation which sometimes goes with the disease.

A team of researchers headed by Dr. Marcel Autret, and under the auspices of the Food and Agriculture Organization and the World Health Organization, has just

returned from Africa where it studied the disease. The researchers found that it is caused by a lack of protein in the diet. However, it can be complicated by other deficiency diseases, such as pellagra.

The disease occurs most frequently where there are no cattle or where fish are not readily available. The people know instinctively what they lack because when they secure a cow or a steer, every last bit of it is eaten. Horns are ground up, tails and even the skin are cooked. Children search for caterpillars, bats, slugs and crickets. These are also sold in market places.

The most pressing need, Dr. Autret said, is for a cheap milk substitute. There are mountains of dried skim milk in the United States, but few dollars with which to buy it. A cheap substitute for milk, he explained, could be made from peanuts. Also, the people must be taught to grow more protein-rich food, such as beans and peas, and to catch more fish.

Science News Letter, February 24, 1951

GENETICS

Inheritance Method Of Mink Colors Found

► MORE MINKS for milady in the popular platinum and steelblu colors will result from the discovery of the exact location of the units of inheritance of these hybrids.

Scientists have found that the inheritance units giving the platinum and steelblu mutations are located at the same point on one of the 14 pairs of chromosomes. Chromosomes are minute bodies that carry the hereditary units in the germ cells.

Because of this knowledge, mink breeders can be advised how to make matings that will produce the greatest number of each of these types, the platinum and steelblu.

Mink skins of the mutated colors are about half of the 2,000,000 ranch mink skins produced annually in this country. On the average they bring higher prices than the natural-colored skins. The discovery about the units of inheritance was made jointly by Department of Agriculture and University of Wisconsin and Wisconsin State scientists.

Science News Letter, February 24, 1951

INVENTION

Vulcanize Tires With Radio Frequency

► PATENT was recently issued for an apparatus for vulcanizing pneumatic tires with radio-frequency electric current. This brought Robert S. Enabnit, Cuyahoga Falls, Ohio, patent 2,541,644. Rights have been assigned to Wingfoot Corporation, Akron, Ohio. The apparatus is claimed to eliminate all the difficulties encountered in previous attempts to vulcanize by radio-frequency current, and it is more simple and less expensive.

Science News Letter, February 24, 1951

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Books of the Week

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BASIC SCIENCE—J. Darrell Barnard and Lon Edwards—*Macmillan*, 631 p., illus., \$3.40. A textbook for high schools.

FACTS ABOUT THE MENOPAUSE—Maxine Davis—*McGraw-Hill*, 172 p., \$2.50. Intended to dispel many old fashioned superstitions and fears.

FIELD THEORY IN SOCIAL SCIENCE: Selected Theoretical Papers—Kurt Lewin—*Harper*, 346 p., illus., \$5.00. Edited by Dorwin Cartwright. A collection of Lewin's papers posthumously selected to clarify the contribution made by him to psychology.

HOW TO EXPAND AND IMPROVE YOUR HOME: The Complete, Step-by-Step Illustrated Guide for Expanding, Altering and Modernizing Your Home—Lee Frankl—*Simmons-Boardman*, 245 p., illus., \$5.95.

HOW TO GROW VEGETABLES: The Complete Garden Guide to Planning, Growing, Preserving and Storing Vegetables, Fruits and Berries—Lloyd C. Cosper and Harry B. Logan—*Duell*, 263 p., illus., \$3.50. A timely aid to the home gardener, beautifully illustrated and conveniently arranged.

AN INTRODUCTION TO THE ANATOMY OF SEED PLANTS—Ernest L. Stover—*Heath*, 274 p., illus., \$4.00. How leaves, stems, and roots develop from the fertilized egg.

AN INTRODUCTION TO THE STUDY OF VIRUSES—Kenneth M. Smith—*Pitman*, 106 p., illus., \$2.50. Bringing together information on plant and animal viruses and bacteriophages.

JAMES LIND: Founder of Nautical Medicine—Louis H. Roddis—*Schuman*, 177 p., illus., \$3.00. The biography of a Scottish naval surgeon of the 18th century.

LICHENS OF THE STATE OF WASHINGTON—Grace E. Howard—*University of Washington Press*, 191 p., illus., paper, \$3.00. Covers 335 of the commoner species.

MANUAL OF THE GRASSES OF THE UNITED STATES—A. S. Hitchcock—*Gov't. Printing Office*, U. S. Dept. of Ag. Misc. Publ. No. 200, 2nd ed., 1051 p., illus., \$3.00. A botanical reference book. Second edition revised by Agnes Chase.

MICROBIOLOGY: General and Applied—William Bowen Sares and others—*Harper*, 493 p., illus., \$4.50. A college text for a first course in bacteriology.

MY SIX CONVICTS: A Psychologist's Three Years in Fort Leavenworth—Donald Powell Wilson—*Rinehart*, 369 p., \$3.50. Reminiscences of three years of research on drug-addiction and criminality in a federal penitentiary.

NASAL SINUSES: An Anatomic and Clinical Consideration—O. E. Van Alyea—*Williams and Wilkins*, 2nd ed., 327 p., illus., \$9.00. Intended for practitioners and specialists.

PAUL EHRLICH—Martha Marquardt—*Schuman*, 255 p., illus., \$3.50. Written by Dr. Ehrlich's former secretary.

PLANS OF FARM BUILDINGS FOR NORTHEASTERN STATES—Bureau of Plant Industry and others—*Gov't. Printing Office*, U. S. Dept. of Ag. Misc. Publ. No. 278, 126 p., illus., paper, \$1.00.

PRACTICAL CERAMICS—Mildred G. Bell—*Bell* (Distributed by Pitman), 53 p., illus., paper, \$1.50. To help you make your own dishes and novelties.

PRIMER ON FRACTURES—Kellogg Speed, Chairman Special Exhibit Committee on Fractures of the AMA, 1951—*Hoeber*, 6th ed., 109 p., illus., \$2.00. Of value to first aid workers.

REPORT OF THE CHIEF OF THE BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY, AGRICULTURAL RESEARCH ADMINISTRATION, 1950—G. E. Hilbert, Chief—*Gov't. Printing Office*, 111 p., paper, 30 cents.

REPORT OF THE CHIEF OF THE BUREAU OF PLANT INDUSTRY, SOILS, AND AGRICULTURAL ENGINEERING, AGRICULTURAL RESEARCH ADMINISTRATION, 1950—Robert M. Salter, Chief—135 p., 30 cents.

RETURN TO LIFE—Lily MacLeod—*Lippincott*, 128 p., \$2.00. The personal narrative of a woman who had cancer and recovered.

SCIENCE AND COMMON SENSE—James B. Conant—*Yale University Press*, 371 p., illus., \$4.00. Explains the methods of science through a historical approach.

STRATIGRAPHY AND SEDIMENTATION—W. C. Krumbein and L. L. Sloss—*Freeman*, 497 p., illus., \$5.00. A college text.

SURGERY OF CATARACT—Daniel B. Kirby—*Lippincott*, 695 p., illus., \$30.00. Representing the training and lifetime experience of an eye surgeon. Well illustrated with black and white figures and colored plates.

TELEVISION AND FM ANTENNA GUIDE—Edward M. Noll and Matthew Mandl—*Macmillan*, 311 p., illus., \$5.50. An antenna textbook and practical guide to the many antenna problems encountered by television technicians.

WATER, LAND, AND PEOPLE—Bernard Frank and Anthony Netboy—*Knopf*, 331 p., illus., \$4.00. The author reviews our mounting water troubles and suggests some solutions.

THE WORLD OF SCIENCE—F. Sherwood Taylor—*Norton*, 2nd ed., 1064 p., illus., \$7.50. An encyclopedic volume containing the basic theories in chemistry, physics and biology.

Science News Letter, February 24, 1951

MEDICINE

Majority of Heart Patients Employable

► THE MAJORITY of patients with heart disease "are employable and may be placed in jobs for which an experienced physician

believes them suited," Rome A. Betts, executive director of the American Heart Association, declared.

Mr. Betts spoke as guest of Watson Davis, director of Science Service, on ADVENTURES IN SCIENCE, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

The American Heart Association, through its rehabilitation programs, is helping heart disease sufferers become productive, self-supporting members of society, able to help turn out materials for defense or to release workers from other jobs for defense work.

Science News Letter, February 24, 1951

AERONAUTICS

High-Lift Airplane Lands On Short Runway

► HIGH-LIFT airplane, on which a patent was issued by the government this week, requires an unusually short runway which makes it usable in areas where space for ordinary landing strips is not available.

It is a plane adapted for military liaison and rescue operations in advanced areas but seems suitable for flying farmers and other private fliers for whom conventional airports are often not available. Patent 2,541,704 was awarded to Otto C. Koppen, Wellesley, Mass. Patent rights are assigned to Helio Aircraft Corporation, Canton, Mass.

For a safe take-off or landing with this plane, a strip from 400 to 600 feet long is required between 50-foot obstructions at either end, and an actual runway at the center of the strip 200 feet long. The plane is capable of acquiring take-off speed in about half this latter distance.

It is a single-propeller plane, with propeller larger than the usual employed on planes of the size. Working with it to provide quick take-off and slow-speed landing are devices mounted on the fixed wings, including leading edge slats and trailing edge flaps.

Science News Letter, February 24, 1951

Sheep may become infected with rabbit fever, *tularemia*.

Defects in logs and heavy timbers can be detected with X-rays.

Vessels equipped with radar can detect obstacles as close as 80 yards.

Menhaden, America's number one fish in volume of production, is seldom used as food; it is used almost exclusively in the manufacture of oils, meals and fish solubles.

Valuable deposits of what are called *rare earth* minerals have been newly discovered in southern California; included are deposits of cerium, lanthanum, neodymium and praseodymium.

• New Machines and Gadgets •

For addresses where you can get more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 558. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

☼ **SMOKE** ring gun, a pistol-like plastic toy for the youngster, sends perfect rings out its nose when the trigger is operated. Chemical smoke pellets are used in the gun. Snapping the gun housing closed strikes the pellet head against a striker strip, creating the harmless smoke.

Science News Letter, February 24, 1951

☼ **PAINT BRUSH**, for applying paint inside radiators and other hard-to-get-at places, consists of a piece of lamb's wool on a metal strip that will bend to any shape and hold the shape. In use, the wool is dipped into a shallow paint pan, then the paint applied to the surface with sideways rubbing action.

Science News Letter, February 24, 1951

☼ **SPILL-PROOF** container for fluids used in ordinary cigarette lighters is held in upright position in use, with its curved spout extending over the side and into the lighter. Filling is accomplished by pressing the sides of the metal container gently with thumb and fingers.

Science News Letter, February 24, 1951

☼ **METAL** toecap for use in shoes to protect the feet of factory workers from dropped objects differs from types now used in that the metal is thicker near its rear edge and thins out to the front. This gives extra strength where the blow is apt to be hardest.

Science News Letter, February 24, 1951

Do You Know?

Baked *spare ribs* is the most popular Christmas dish in Norway.

Aromatic or *Turkish tobacco* is now being grown in Virginia.

Waterfowl eggs from Iceland, brought by air to the Philadelphia Zoo, were hatched under mallard ducks, thus obtaining 20 birds of six species.

Nearly 3,000 farms in the United States are now certified as *tree farms*; their principal crop is lumber and other wood products.

Red lighting for automobile instrument panels is recommended because eyes adjust more easily from red to darkness than they do from other colors.

The *gypsy moth*, a tree pest that has caused great damage in the northeastern states, is facing elimination with the spraying of DDT on forests and street trees by airplane.



☼ **RADIATION** detector, for personnel using radioactive materials, checks hands and feet at the same time. The person stands on the device, as shown in the picture, with hands in checker pockets and feet on a

checker platform. A beta-gamma count registers automatically in five seconds.

Science News Letter, February 24, 1951

☼ **EYE PAD** mask, for hot or cold application to soothe eyes, is a plastic device to fit over the area around the eyes; it has two small openings to permit sight. The device is filled with a sealed-in, temperature-holding chemical solution that is heated by immersion in hot water or cooled in a refrigerator.

Science News Letter, February 24, 1951

☼ **METALLIC** ink, based on vinylite resin and suitable for use on special cards and magazine covers, has exceptional affinity to paper, high gloss and excellent resistance to fading and aging. It does not rub off despite constant handling.

Science News Letter, February 24, 1951

☼ **ALTITUDE** device, that will measure height above sea level with an accuracy of approximately two feet, is an improved aneroid type barometric leveling instrument developed by the Army Corps of Engineers. Improvements include high sensitivity and electric illumination for night lighting.

Science News Letter, February 24, 1951

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